METEOROLOGY
REVIEW

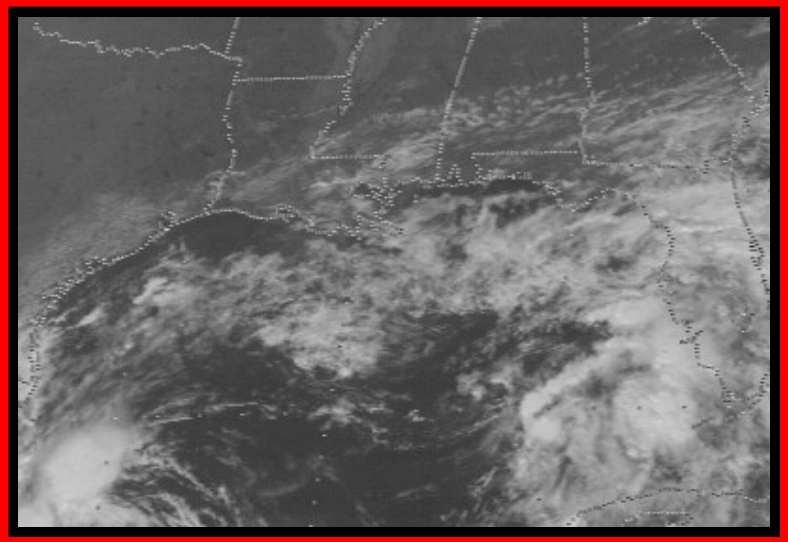
MCAS Beaufort, SC

STATION DESCRIPTION:

LAT/LONG :32 29'N 80 43'W ICAO IDENTIFIER: KNBC
CONVERSION TO UTC: +5 (+4 DST) ELEVATION: 38 FT

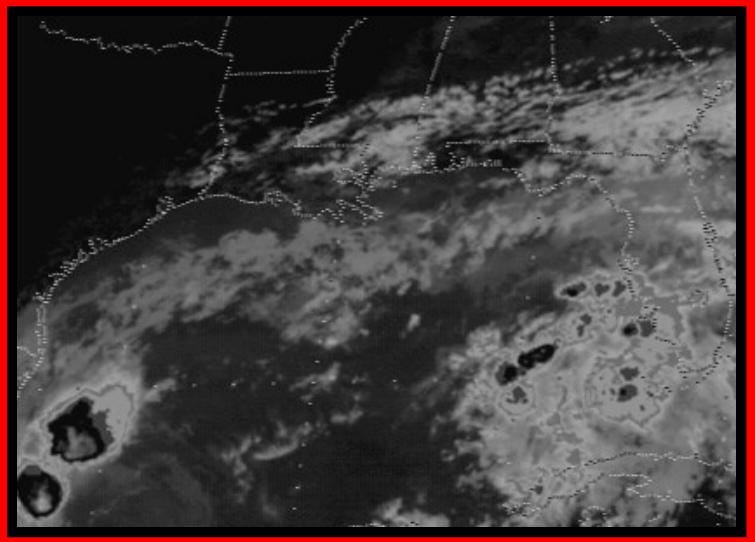
RUNWAYS:
23/05: 12,200' X 200'
32/14: 8,000' X 200'

GOES 8 Satellite Imagery



Visual

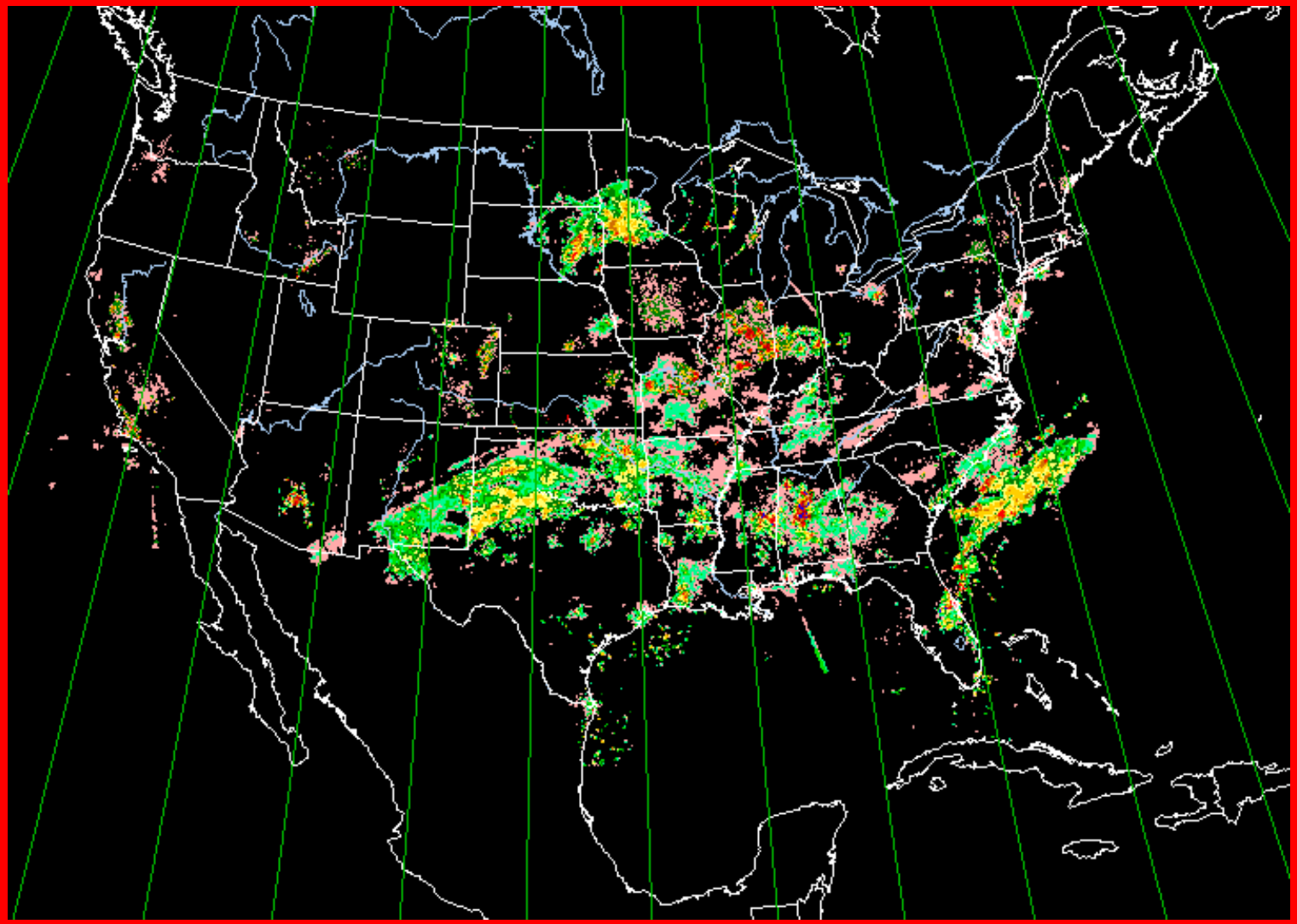
“Aerial Photograph”



Infra-red

Temperature

NEXRAD Doppler Radar Mosaic



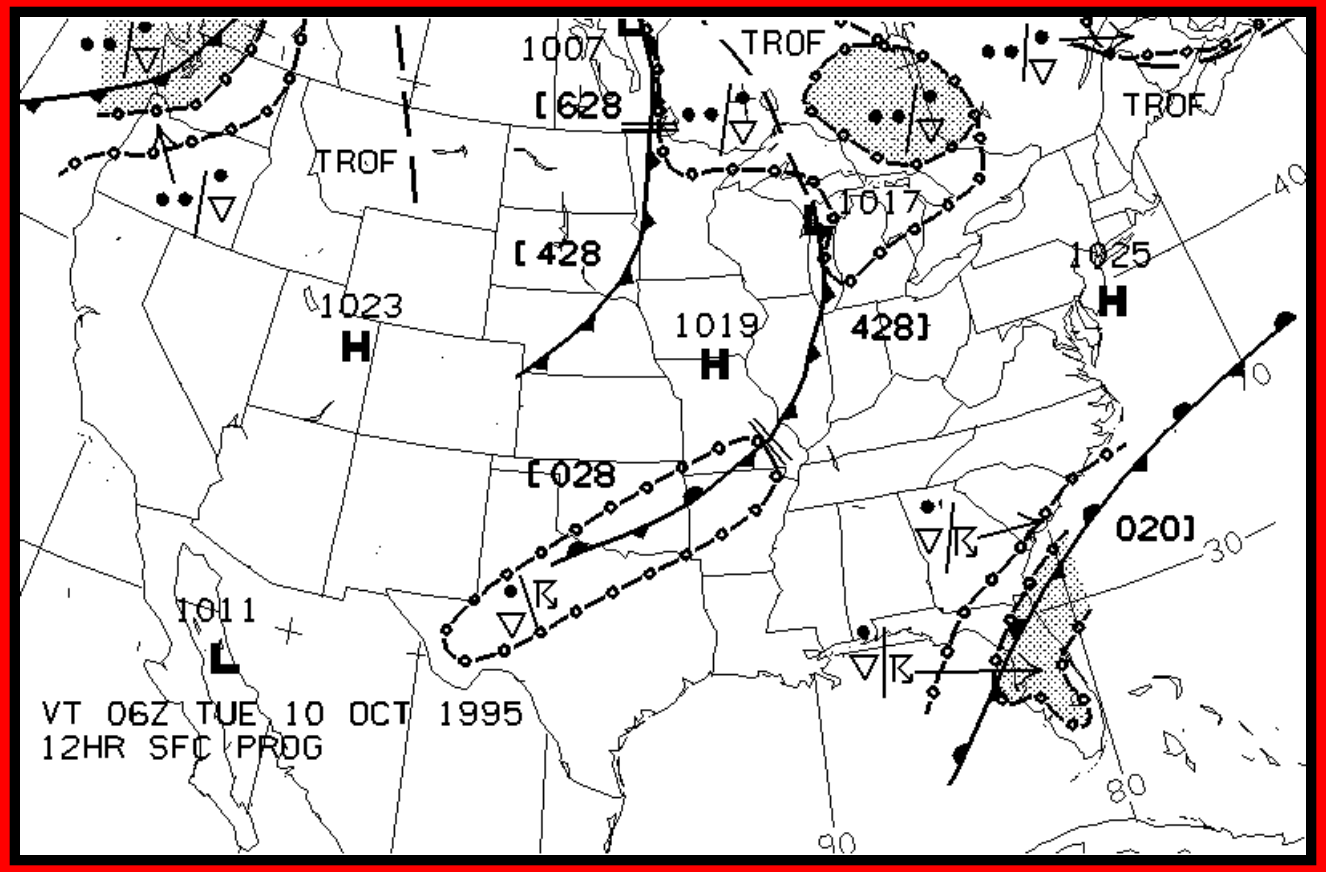
MCAS Beaufort Pilot to Metro Circuit 264.5 Mhz

Weather Charts (Facsimile)

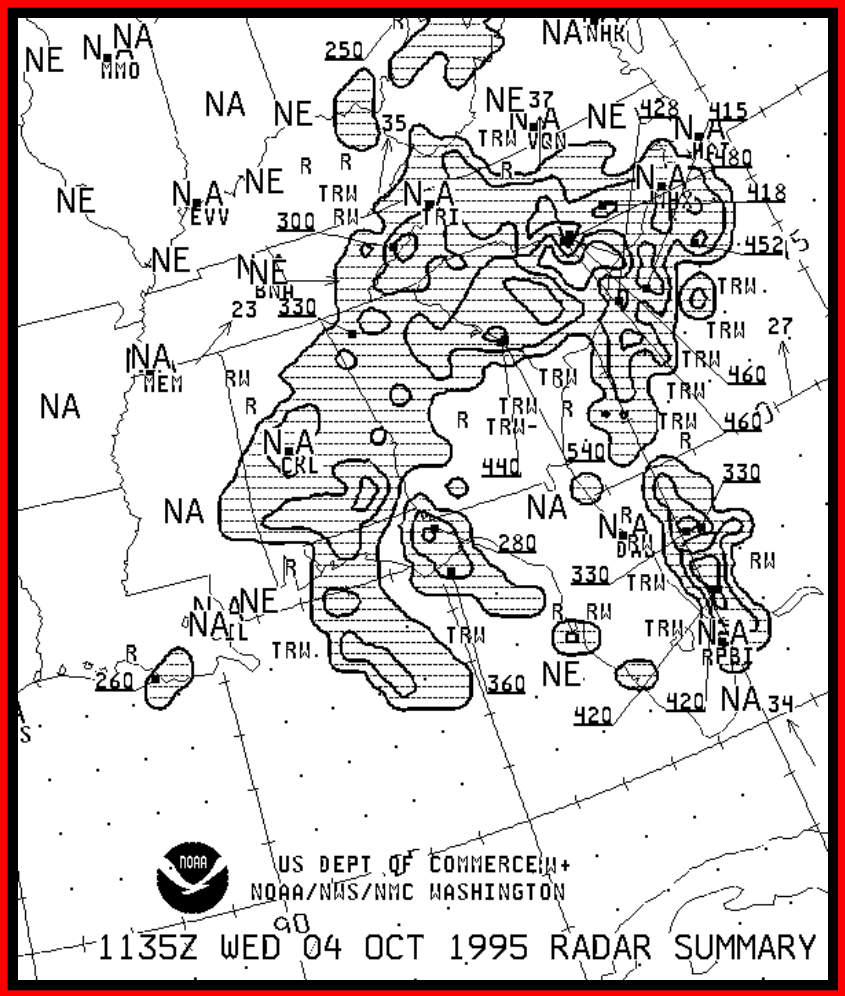
- Surface Prognostic Chart
- Radar Summary Chart
- Significant Weather Chart
- Surface Weather Depiction Chart

Surface Prognostic Chart

Forecast positions of frontal systems, precipitation and areas of high/low pressure



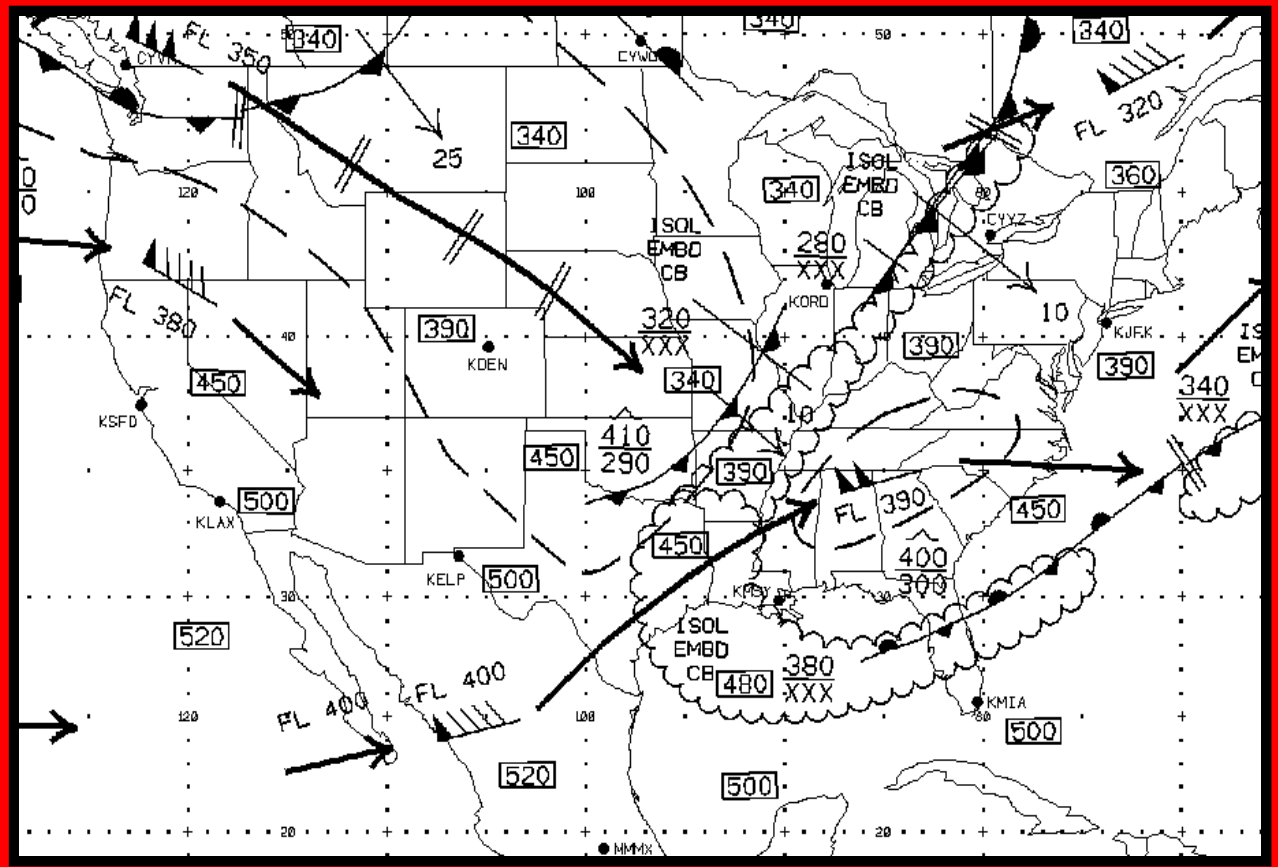
Radar Summary Chart



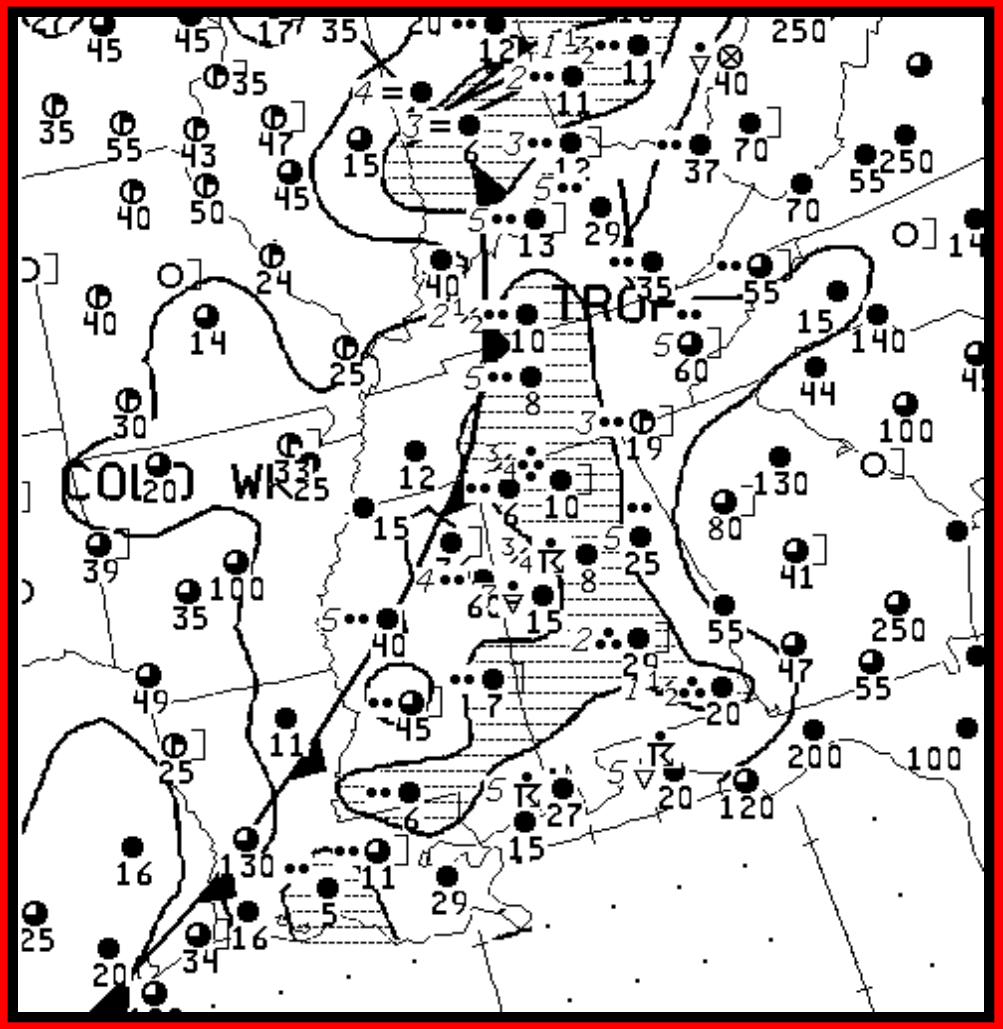
- **Displays location & intensity of:**
  - **rain**
  - **rainshowers**
  - **thunderstorms**

Significant Weather Chart

- Forecasts WX at cruising altitude
- Important source for potential CAT
- Displays location of Jet Streams



Surface Weather Depiction Chart



Provides a display of IFR, Marginal VFR and VFR clear areas.

Alpha-numeric Reports

- **WA / WS** - In-flight Weather Advisories (Non-convective)
- **FT** - Terminal Forecast
- **UA** - Pilot Reports
- **FD** - Flight Level Winds Forecast

In-flight Weather Advisories WA & WS

- Less severe than WW’s
- Update Area Forecast to inform pilo
  of forecast hazardous WX along
  planned route of flight
- In-flight - ATC will pass new Adviso
  to pilots

In-flight Weather Advisories (continued)

WA - AIRMET

WX potentially hazardous to aircraf
limited pilot experience or capabilit

WBC WA 061130
AIRMET WHISKEY 2 061230-061330
WX VA MD DC NC SC.
FM 50NE EKN TO BWI TO 30NW AGS TO 60E BRG.
OCNL MDT TURB BLO 120. CONT ADVY BYD 1330Z.

WS - SIGMET

WX potentially hazardous to all a

WBC WS 06TB15
SIGMET MIKE 2 061815-062215
WX VA MD DC DE NC SC.
FM 60 NE PKB TO 100 N SBY TO OFF TO ELW TO 60 E CNA.
MDT TO OCNL SVR TURBC AOB 120 OVER AND LEE OF MTNS. RPTD BY ACFT.
CONT ADVY BYD 2215Z.

TAF - Terminal Aerodrome Forecast

- **Provides pilot with forecast weather.**
- **Use *WORST* WX conditions for period <u>+/- 1 hour</u> of ETA for both DEST & ALT.**
- **Pilot responsibility to determine need for ALT.**

```
0920
FTUS KAWN 030925Z

KNPA TAF 0909 VRB05KT 9999 SCT010 BKN040 BKN150
   QNH2995INS CIG040
   BECMG 1820 1808KT 9999 SCT020 BKN080
   QNH3002INS CIG080
   TEMPO 1820 4800 SHRA BKN010 BKN030 CIG010
```

UA - Pilot Report

- Reports of WX conditions actually encountered observed by other pilots
- Pilots strongly encouraged to provide PIREPS, particularly in adverse WX conditions
- FAR 91 Requires pilots to provide PIREP if unforeseen or unforecast WX encountered
- PIREP format located in FIH

UA

US KAWN 181800

AEX UA /OV LFK 360020 1753 FL 410/TP T-38/SK BKN 290-330/TB LGT
RM BLD UPS N
BIX UA /OV BIX 1707 FL 90/TP C130/DK EST BKN 75/TB LGT-MDT 60

FD - Winds Aloft Forecast

- Used to determine altitude for best winds
- Used to compute Groundspeed, Time, & Fuel

FD NBC 250550
BASED ON 250000Z DATA
VALID 251200Z FOR USE 0600Z-1500Z. TEMPS NEG ABV 24000

FT	3000	6000	9000	12000	18000	24000	30000	34000
XQP	3320-07	3133-08	3147-09	3067-18	3076-30	308544	298853	298961
CAE	9900	3110-05	3023-06	3036-07	3056-16	3063-28	307143	307453
ATL	0805	2907-03	3018-04	3029-06	3046-16	3054-28	30643	296752

Weather Warnings

- WW - Severe Weather Watch/Warning Bulletin
- Convective Sigmet - Weather Warning
- Local Area Warnings

WW - Severe Weather Watch Bulletin

MKO WW 210237

BULLETIN - IMMEDIATE BROADCAST REQUESTED
TORNADO WATCH NUMBER 21
NATIONAL WEATHER SERVICE KANSAS CITY MO
940 PM CST WED FEB 20 19XX

A...THE NATIONAL SEVERE STORMS FORECAST CENTER HAS ISSUED A TORNADO WATCH FOR
A LARGE PORTION OF OKLAHOMA
A LARGE PORTION OF CENTRAL TEXAS
FROM 10 PM CST UNTIL 4 AM CST THIS THURSDAY MORNING.

TORNADOES...LARGE HAIL... AND DAMAGING THUNDERSTORM WINDS ARE POSSIBLE IN THESE AREAS.

THE TORNADO WATCH ARE IS ALONG AND 70 STATUTE MILES EITHER SIDE OF A LINE FORM 25 MILES NORTH OF OKLAHOMA CITY OKLAHOMA TO 35 MILES SOUTHEAST OF BROWNWOOD TEXAS.

WW (continued)

- Displayed on a plotting board inside the Weather Office
- Provides areas of probable severe weather along route of flight
- Squadron may prohibit flight into WW areas

Flight Exceptions for WW's

- **Except for operational necessity, emergencies and flights involving all-weather research projects or weather reconnaissance, pilots shall not file into or through areas which the National Weather Service has issued a WW unless one of the following exceptions apply:**
  - a **Storm development has not progressed as forecast for the planned route. In such situations:**

(next slide)

Flight Exceptions (continued)

1. VFR flight is permitted if existing and forecast weather for the route permits such flights
2. IFR flights may be permitted if aircraft radar is installed and operational thus permitting detection and avoidance of isolated thunderstorms
3. IFR Flight is permitted in positive control areas if visual meteorological conditions can be maintained thus enabling aircraft to detect and avoid isolated thunderstorms

b. Performance characteristics of aircraft permit an enroute altitude above existing or developing severe storms

NATOPS OPNAVINST 3710.7R

section 4.6.3.5

Convective Sigmets

- **ISSUED HOURLY BY NATIONAL WEATHER SERVICE.**
- **ANY CONVECTIVE SIGMET IMPLIES:**
  - **Severe or greater turbulence**
  - **Low level wind shear**
  - **Severe icing**
- **ISSUING CRITERIA:**
  - **Embedded thunderstorms - thunderstorms masked by non-convective clouds, precipitation or residual cloud layers.**
  - **Line of thunderstorms - a ratio of length to width > 5:1 for area of concern.**
  - **Area of thunderstorms - ≥ 3,000 square mile extent**
  - **Hail of 3/4 or greater**
  - **Tornadoes**

Local WX Warnings

- **Thunderstorm Condition 2**
- **Destructed weather indicated that is observed (visually or on RADAR) within 60nm of MCAS**
- **A storm is forecast to form within 60nm of MCAS within 3 hours of issue**
- **MCAS is within a NWS severe weather warning area (WW)**

- **Thunderstorm Condition 1**
- **Destructive weather of the type indicated is imminent**
- **Imminent thunderstorm/tornado is expected to pass/form within 5 nm of MCAS within 1 hour**
- **Phenomena is observed (visually or on RADAR) within 15 nm of MCAS and is expected to pass within 5 nm in less than 1 hour**
- **or greater**

50 kts or greater winds

Tornadic activity

Local Wind Warnings

- **Surface Wind Warning**
- **Winds sustained between 15 and 33 knots**
- **Frequent gusts of 25 knots of greater**

- **Gale Warning**
- **Winds sustained between 34 and 47 knots**

- **Whole Gale (Storm) Warning**
- **Winds sustained between 48 and 63 knots**

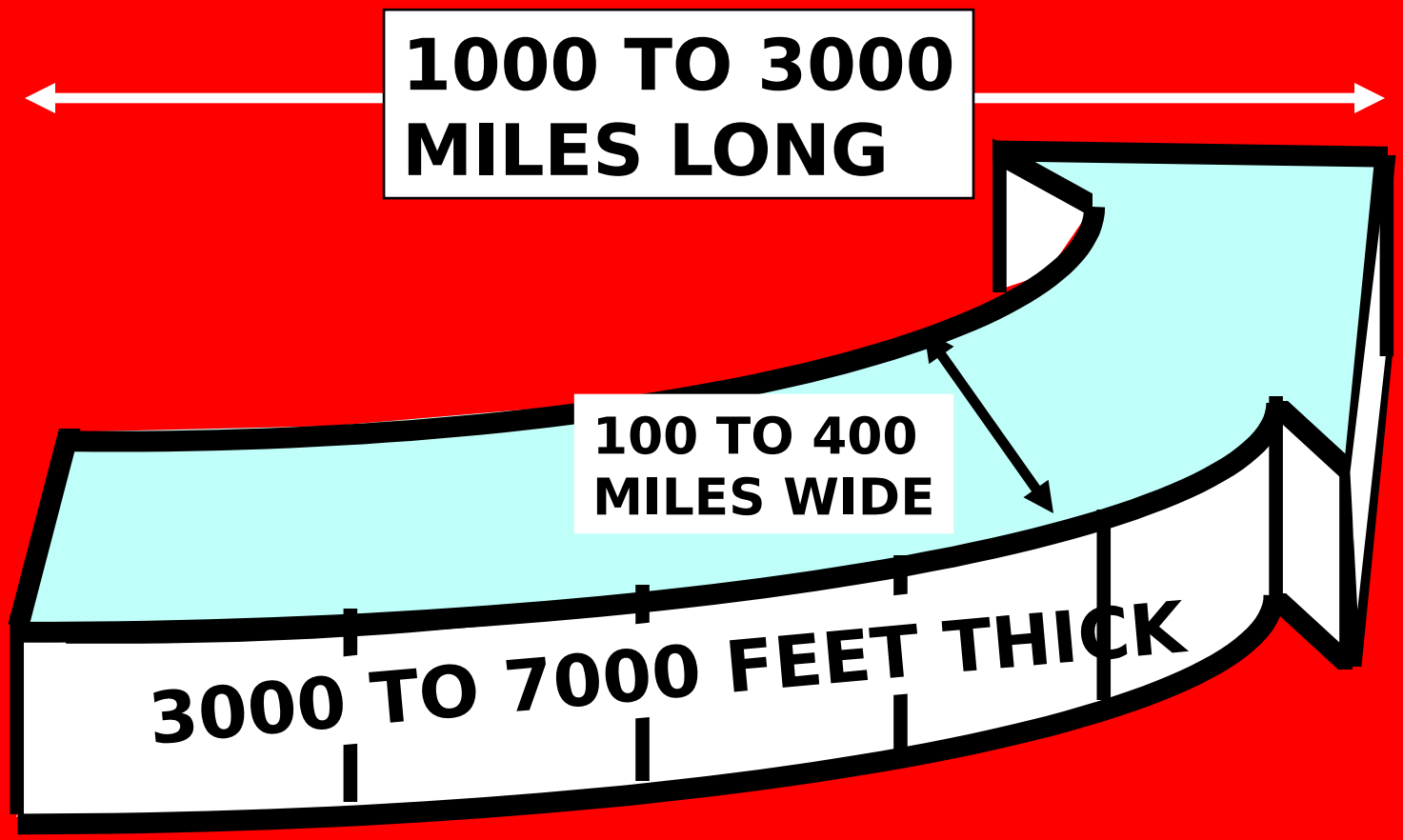
f 3/4 in or greater

50 or greater winds

Jet Streams

- A narrow river of extremely strong wind generated when the Polar & Tropical air masses encounter each other
- Average wind speed: 100 - 150 KTS (Can reach in excess of 300 KTS)
- 3 Major Jet Streams in the Northern Hemisphere of which the one which flows through the U.S. mid-latitudes is our primary consideration

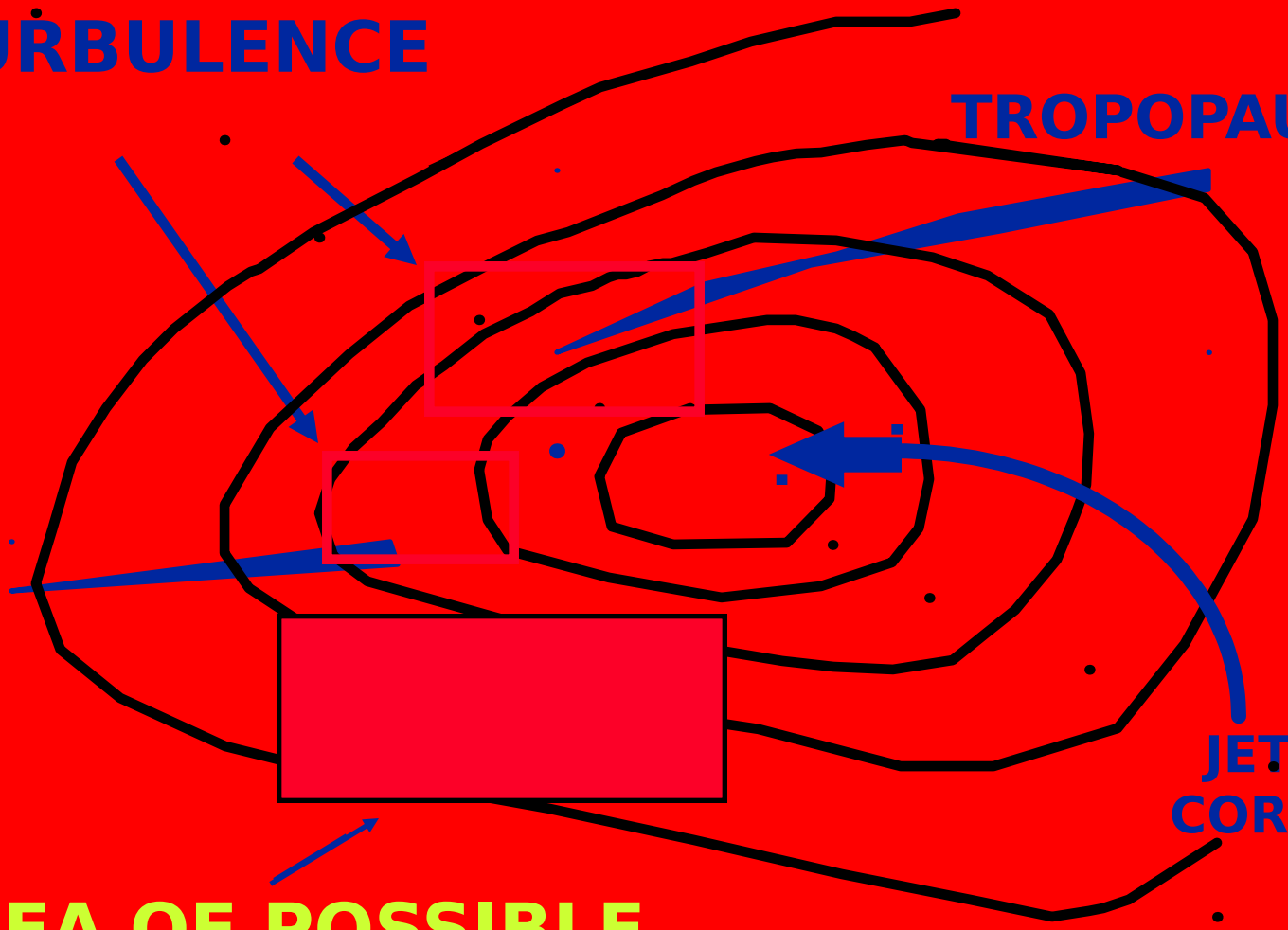
General Size of a Jet Stream



AREAS OF POSSIBLE TURBULENCE

ISOTACHS

TROPOPAUSE



JET CORE

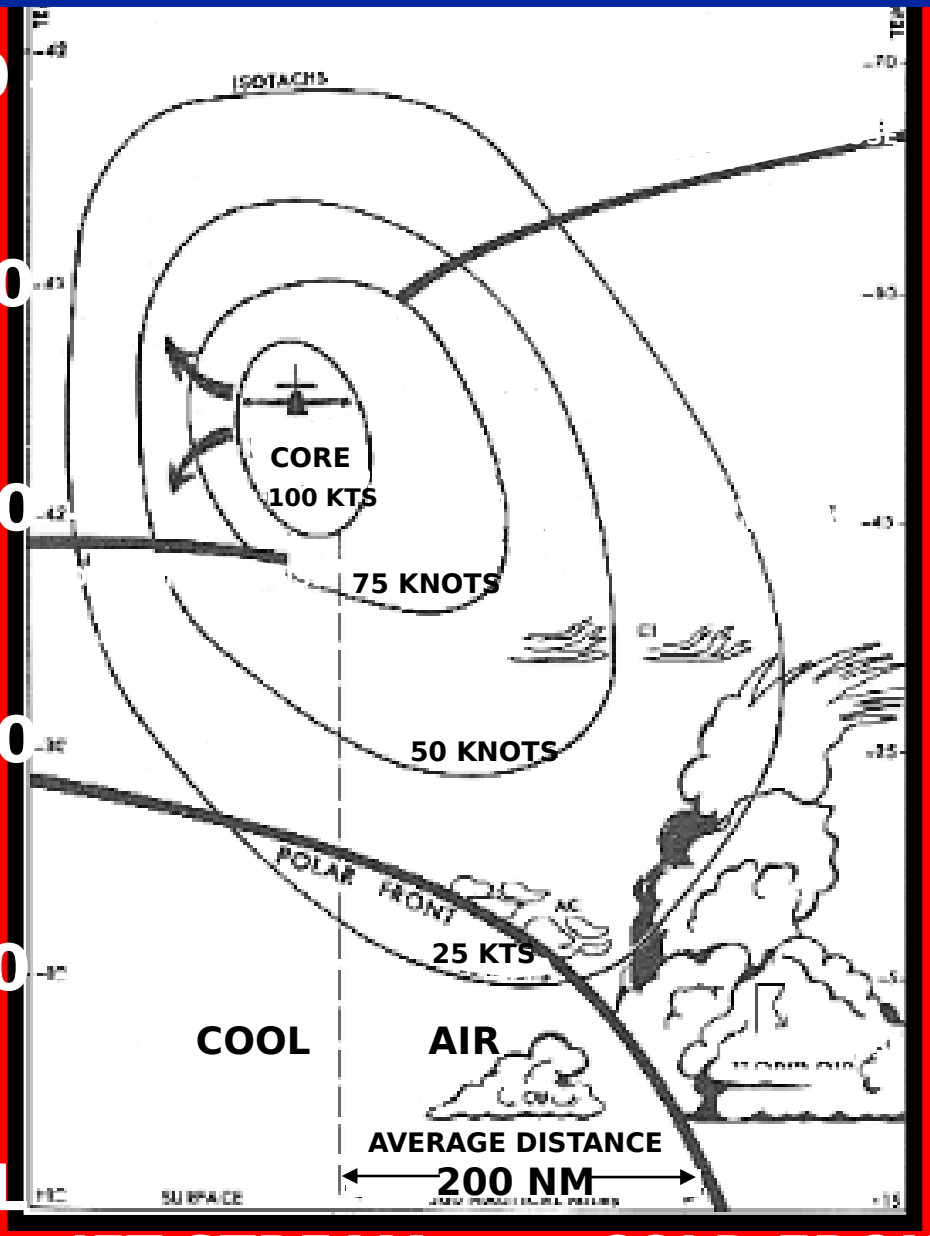
AREA OF POSSIBLE MAXIMUM TURBULENCE

(APPROXIMATELY 25,000’–30,000’)

Vertical Cross Section of a Jet Strea

ALTITUDE IN THOUSANDS OF FEET

50
40
30
20
10
SL



JET STREAM

COLD FRONT

TO EXIT EFFECTS OF TURBULENCE OR ADVERSE WINDS:

CLIMB

OR

DESCEND

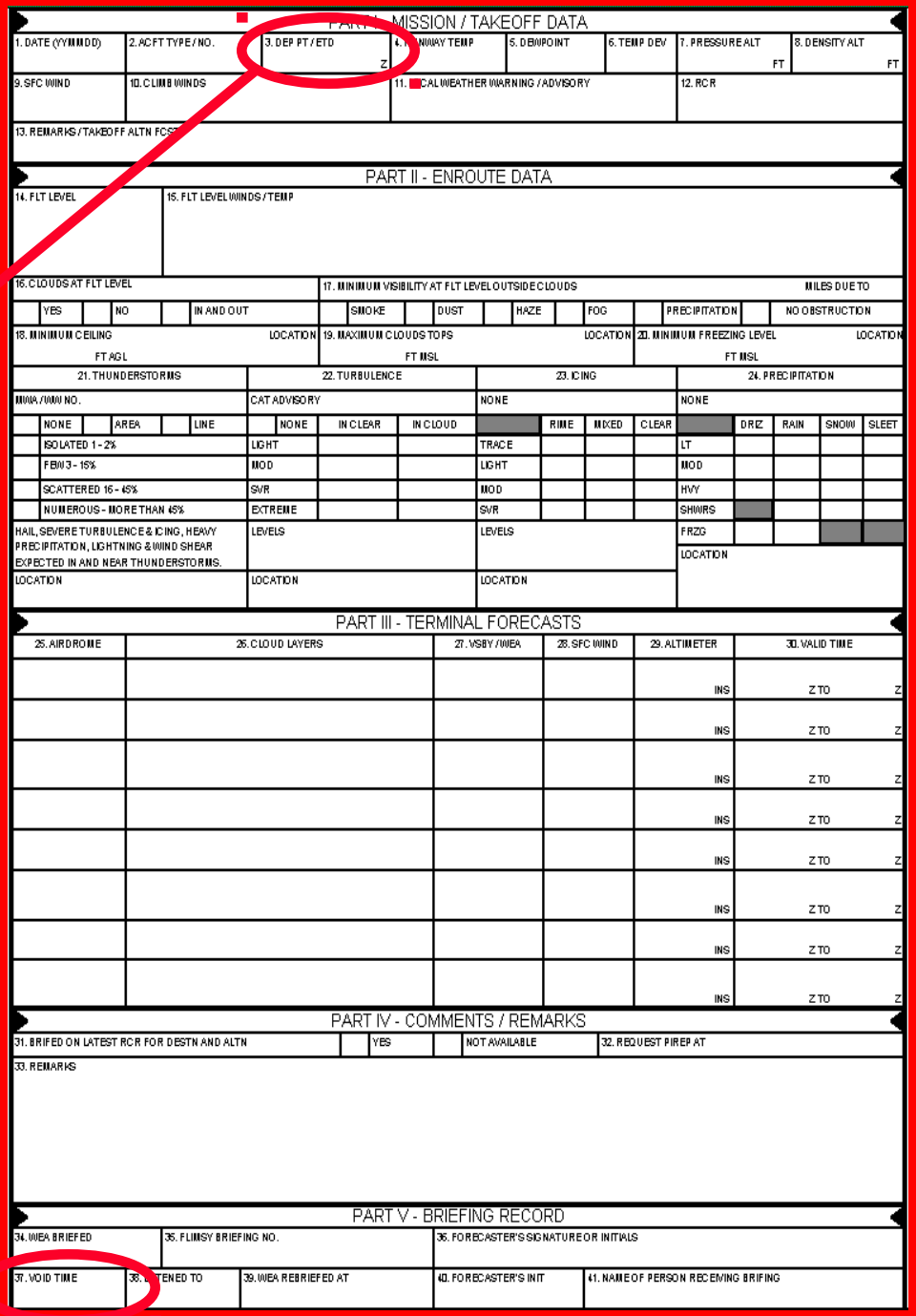
TO NORTH SIDE

Seasonal Migration of the Jet Stream

- **WINTER:**
  - **Shifts South**
  - **Core increases in altitude**
  - **Winds increase in velocity**
- **SUMMER:**
  - **Shifts North**
  - **Core decreases in altitude**
  - **Winds decrease in velocity**

DD 175-1

- Departure time - pilot may receive brief no more than 2 hours before ETD.
- Void time - not valid 30 minutes after ETD.



PART I - MISSION / TAKEOFF DATA

1. DATE (YYMMDD)	2. ACFT TYPE / NO.	3. DEP PT / ETD Z	4. RUNWAY TEMP	5. DEWPOINT	6. TEMP DEV	7. PRESSURE ALT FT	8. DENSITY ALT FT
9. SFC WIND	10. CLIMB WINDS		11. SIGNIFICANT WEATHER WARNING / ADVISORY			12. RCR	
13. REMARKS / TAKEOFF ALTN FCST							

PART II - ENROUTE DATA

14. FLT LEVEL	15. FLT LEVEL WINDS / TEMP

16. CLOUDS AT FLT LEVEL	17. MINIMUM VISIBILITY AT FLT LEVEL OUTSIDE CLOUDS	MILES DUE TO
YES NO IN AND OUT	SMOKE DUST HAZE FOG	PRECIPITATION NO OBSTRUCTION
18. MINIMUM CEILING FT AGL LOCATION	19. MAXIMUM CLOUDS TOPS FT MSL LOCATION	20. MINIMUM FREEZING LEVEL FT MSL LOCATION

21. THUNDERSTORMS	22. TURBULENCE			23. ICING				24. PRECIPITATION				
WWA / WAN NO.	CAT ADVISORY			NONE				NONE				
NONE AREA LINE	NONE	IN CLEAR	IN CLOUD		RIME	MIXED	CLEAR		DRIZ	RAIN	SNOW	SLEET
ISOLATED 1 - 2%	LIGHT			TRACE				LT				
FEW 3 - 15%	MOD			LIGHT				MOD				
SCATTERED 16 - 45%	SVR			MOD				HVY				
NUMEROUS - MORE THAN 45%	EXTREME			SVR				SHWRS				
HAIL, SEVERE TURBULENCE & ICING, HEAVY PRECIPITATION, LIGHTNING & WIND SHEAR EXPECTED IN AND NEAR THUNDERSTORMS.	LEVELS			LEVELS				FRZG				
LOCATION	LOCATION			LOCATION				LOCATION				

PART III - TERMINAL FORECASTS

25. AIRDROME	26. CLOUD LAYERS	27. VSBY / WEA	28. SFC WIND	29. ALTIMETER	30. VALID TIME
				INS	Z TO Z
				INS	Z TO Z
				INS	Z TO Z
				INS	Z TO Z
				INS	Z TO Z
				INS	Z TO Z
				INS	Z TO Z
				INS	Z TO Z

PART IV - COMMENTS / REMARKS

31. BRIEFED ON LATEST RCR FOR DESTN AND ALTN	YES	NOT AVAILABLE	32. REQUEST PIREP AT
33. REMARKS			

PART V - BRIEFING RECORD

34. WEA BRIEFED	35. FLIMSY BRIEFING NO.	36. FORECASTER'S SIGNATURE OR INITIALS	
37. VOID TIME	38. LISTENED TO	39. WEA REBRIEFED AT	40. FORECASTER'S INIT	41. NAME OF PERSON RECEIVING BRIFING

VFR Stamp

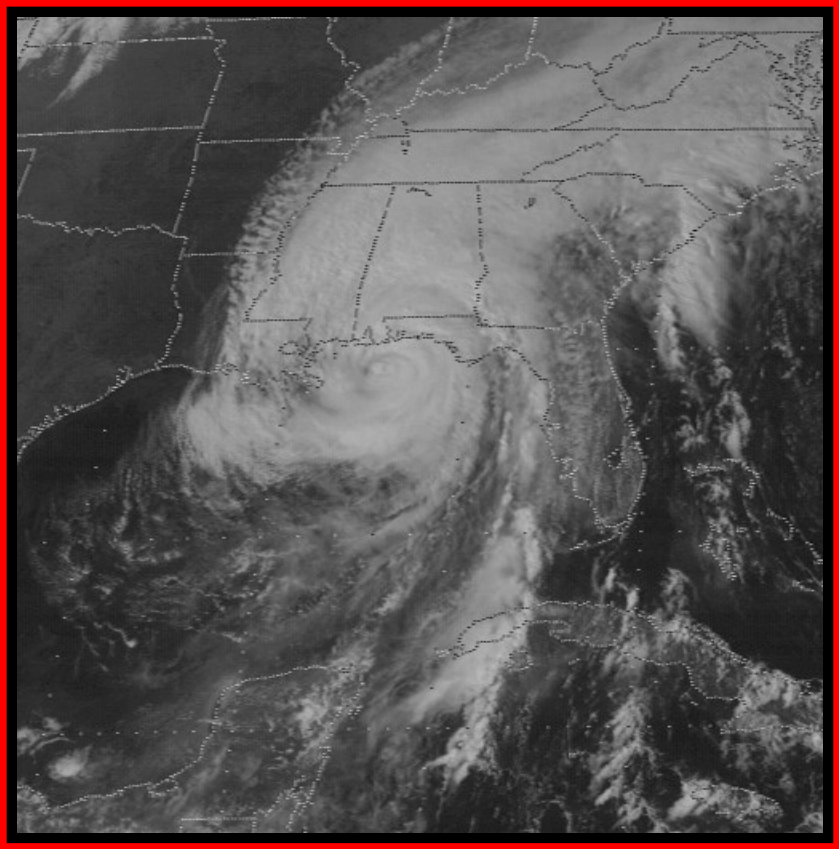
BRIEFING VOID ..... Z, FLIGHT AS PLANNED CAN BE CONDUCTED UNDER VISUAL FLIGHT RULES, VERBAL BRIEFING GIVEN AND HAZARDS EXPLAINED, FOLLOWING SIGMETS ARE KNOWN TO BE CURRENTLY IN EFFECT ALONG PLANNED ROUTE OF FLIGHT ..... HAZRARDS .....
.....

.....
(SIGNATURE OF FORECASTER)

- MUST FILE VFR FOR ENTIRE PLANNED ROUTE.
- PILOT MUST REQUEST STAMP.
- AVAILABLE ONLY AT FORECASTER'S DISCRETION.
- WEATHER MUST BE VFR
- LOCAL FLYING AREA ONLY (350 NM)

Hurricane Season

- **June 1st - November 30th every year.**



Hurricane Opal
04OCT95 2200Z

Tropical Cyclones

Tropical low or disturbance	< 10 kts
Tropical Depression	10 - 34 kts
Tropical Storm	35 - 63 kts
Hurricane/Typhoon	≥ 64 kts

Tropical Conditions of Readiness

- Set by COMNAVREG SE (Area A1)
- Condition 5 - Seasonal condition (to heighten awareness).
- Condition 4 - Storm conditions within 72 hrs.
- Condition 3 - Storm conditions within 48 hrs.
- Condition 2 - Storm conditions within 24 hrs.
- Condition 1 - Storm conditions within 12 hrs.

KEY to AVIATION ROUTINE WEATHER REPORT

(METAR)

METAR KNGU 210955Z COR 24015G25KT 3SM-SN SCT000
BKN005 OVC012 02/M01 A3005 RMK SLP055 T00211013

METAR – HOURLY OBSERVATION

SPECI – SPECIAL OBSERVATION

METAR KNGU 210955Z COR 24015G25KT 3SM-SN SCT000 BKN005 OVC012 02/M01 A3005 RMK SLP055 T00211013

STANDARD FOUR LETTER ICAO IDENTIFIER FOR THE AIRFIELD

METAR KNGU 210955Z COR 24015G25KT 3SM-SN SCT000
BKN005 OVC012 02/M01 A3005 RMK SLP055 T00211013

DDHHMMZ = DATE AND TIME
OBSERVATION WAS TAKEN IN U.T.C. (ZULU)

METAR KNGU 210955Z COR 24015G25KT 3SM-SN SCT000 BKN005 OVC012 02/M01 A3005 RMK SLP055 T00211013

COR = CORRECTION TO A PREVIOUSLY TRANSMITTED OBSERVATION

AUTO = AUTOMATED (ASOS) REPORT WITH NO HUMAN INTERVENTION

METAR KNGU 210955Z COR 24015G25KT 3SM-SN SCT000 BKN005 OVC012 02/M01 A3005 RMK SLP055 T00211013

1st THREE DIGITS = WIND DIRECTION FROM (NEAREST 10 DEGREES) TO TRUE NORTH

2nd TWO(THREE) DIGITS = WIND SPEED IN KNOTS

G & NEXT TWO (THREE) DIGITS = GUST IN KNOTS
00000KT = CALM

ALL WINDS BASED ON A 2 MINUTE AVERAGE

METAR KNGU 210955Z COR 24015G25KT 3SM-SN SCT000 BKN005 OVC012 02/M01 A3005 RMK SLP055 T00211013

PREVAILING VISIBILITY IN STATUTE MILES

HORIZONTAL @ 6 FEET

PREVAILING = THE GREATEST VISIBILITY EQUALED OR EXCEEDED THROUGHOUT AT LEAST HALF OF THE HORIZON CIRCLE

METAR KNGU 210955Z COR 24015G25KT 3SM-SN SCT000 BKN005 OVC012 02/M01 A3005 RMK SLP055 T00211013

QUALIFIER

-LIGHT “NO SIGN” MODERATE + HEAVY

VC = WITHIN 5-10 SM OF POINT OF OBSERVATION

DESCRIPTOR

MI = SHALLOW, BC = PATCHES, PR = PARTIAL

TS = THUNDERSTORM, BL = BLOWING, SH = SHOWERS

DR = DRIFTING, FZ = FREEZING

METAR KNGU 210955Z COR 24015G25KT 3SM-SN SCT000
BKN005 OVC012 02/M01 A3005 RMK SLP055 T00211013

WEATHER PHENOMENA

PRECIPITATION

DZ = DRIZZLE, RA = RAIN, SN = SNOW, SG = SNOW GRAINS
IC = ICE CRYSTALS, PL = PELLETS, GR = HAIL
S = SMALL HAIL/SNOW PELLETS, UP = UNKN PRECIP IN AUTO OB

OBSCURATION

BR = MIST (>/= 1000M), FG = (<1000M), FU = SMOKE
= VOLCANIC ASH, SA = SAND, PY = SPRAY, DU = WIDESPREAD D

OTHER

SQ = SQUALL, SS = SANDSTORM, DS = DUSTSTORM
PO = WELL DEVELOPED DUST/SAND WHIRLS
FC = FUNNEL CLOUD, +FC = TORNADO/WATERSPOUT

METAR KNGU 210955Z COR 24015G25KT 3SM-SN SCT000 BKN005 OVC012 02/M01 A3005 RMK SLP055 T00211013

CLOUD AMOUNT HEIGHT AND TYPE

CLOUD AMOUNT IN OCTAS (8ths)

SKC = CLEAR (0/8TH)

FEW = FEW (1-2/8TH)

SCT = SCATTERED (3-4/8TH)

BKN = BROKEN (5-7/8TH)

OVC = OVERCAST (8/8TH)

HEIGHT (AGL) IN HUNDREDS OF FEET

012 = 1, 200 FT

050 = 5,000 FT

180 = 18,000FT

CLOUD TYPE

CB = CUMULONIMBUS

TCU = TOWERING CUMULUS

METAR KNGU 210955Z COR 24015G25KT 3SM-SN SCT000 BKN005 OVC012 02/M01 A3005 RMK SLP055 T00211013

TEMPERATURE & DEW POINT (DEGREES C)

NEGATIVE TEMPERATURES ARE PREFIXED WITH “M”

METAR KNGU 210955Z COR 24015G25KT 3SM-SN SCT000 BKN005 OVC012 02/M01 A3005 RMK SLP055 T00211013

ALTIMETER SETTING IN INCHES OF MERCURY

IN TENS / UNITS / TENTHS / HUNDREDTHS

3005 = 30.05 INCHES OF MERCURY

METAR KNGU 210955Z COR 24015G25KT 3SM-SN SCT000 BKN005 OVC012 02/M01 A3005 RMK SLP055 T00211013

REMARKS

SLP = SEA LEVEL PRESSURE IN MILLIBARS (THE LOCAL ATMOSPHERIC PRESSURE ADJUSTED AS IF THE AIRFIELD WAS LOCATED AT M.S.L.)
055=1005.5 MILLIBARS

T = ACTUAL AIR TEMPERATURE & DEW POINT

T 0 0 2 1 1 0 1 3

INDICATOR- TEMP TENS- TEMP UNITS- TEMP TENTHS- INDICATOR- D.P. TENS - D.P. UNITS- D.P. TENTHS-

INDICATORS: 0 = POSITIVE, 1 = NEGATIVE

MCAS Beaufort Weather POCs

Weather Officer	X7868
Weather SNCOIC	X7974
Duty Forecaster/Observer	X7904/7927
Admin/Climo/Training	X7926
Fax (DD175s)	X6303
Recorded Forecast	X7001

THE END